

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

5 Listing of Claims:

Claim 1 (currently amended): A method of defect root cause analysis comprising following steps:

 providing a sample which comprises a plurality of defects;

 performing a defect inspection to detect sizes and locations of the plurality of
10 defects;

 performing a chemical state analysis of the sample;

 performing a mapping analysis according to a result of the chemical state
analysis, wherein the mapping analysis comprises:

forming the defects into a defect pattern; and

15 combining the defect pattern with a predetermined pattern on the sample;
 and

 analyzing the root cause of the defects according to a result of the mapping
analysis the combination of the defect pattern and the predetermined pattern on the
sample.

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Claim 2 (original): The method of claim 1 further comprising performing a defect classification after finishing the defect inspection for judging a defect type of the defects and performing a corresponding chemical state analysis according to the defect type of the defects.

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Claim 3 (original): The method of claim 1 wherein an auger analysis is performed in the chemical state analysis when the defects are smaller than 0.2 μ m or are not single phase particles.

30 Claim 4 (original): The method of claim 3 wherein the auger analysis utilizes a

scanning auger microscopy (SAM) or an auger electron spectroscopy (AES) to perform the chemical state analysis of the sample.

Claim 5 (original): The method of claim 1 wherein an energy dispersive spectrometer (EDS) is utilized to detect in the chemical state analysis when the defects are equal to or larger than $0.2 \mu m$, single phase, or thick particles.

Claim 6 (original): The method of claim 1 wherein the chemical state analysis comprises a point scan analysis, delayer analysis, and depth profile analysis.

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Claim 7 (currently amended): A method of defect root cause analysis comprising following steps:

providing a sample with a plurality of defects;
performing a voltage contrast to identify locations of the defects;
15 cutting the sample with a focus ion beam (FIB) to expose a cross-section of the sample;
utilizing auger electrons to perform a chemical state analysis of the cross-section of the sample;
performing a mapping analysis according to a result of the chemical state
20 analysis, wherein the mapping analysis comprises:
forming the defects into a defect pattern; and
combining the defect pattern with a predetermined pattern on the sample; and
judging a root cause of the defect generation according to a result of the mapping analysis the combination of the defect pattern and the predetermined pattern on the
25 sample.

Claim 8 (original): The method of the claim 7 wherein the method utilizes a scanning auger microscopy (SAM) or an auger electron spectroscopy (AES) to perform a chemical state analysis of the cross-section of the sample.

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Claim 9 (original): The method of claim 7 wherein the chemical state analysis comprises a point scan analysis.